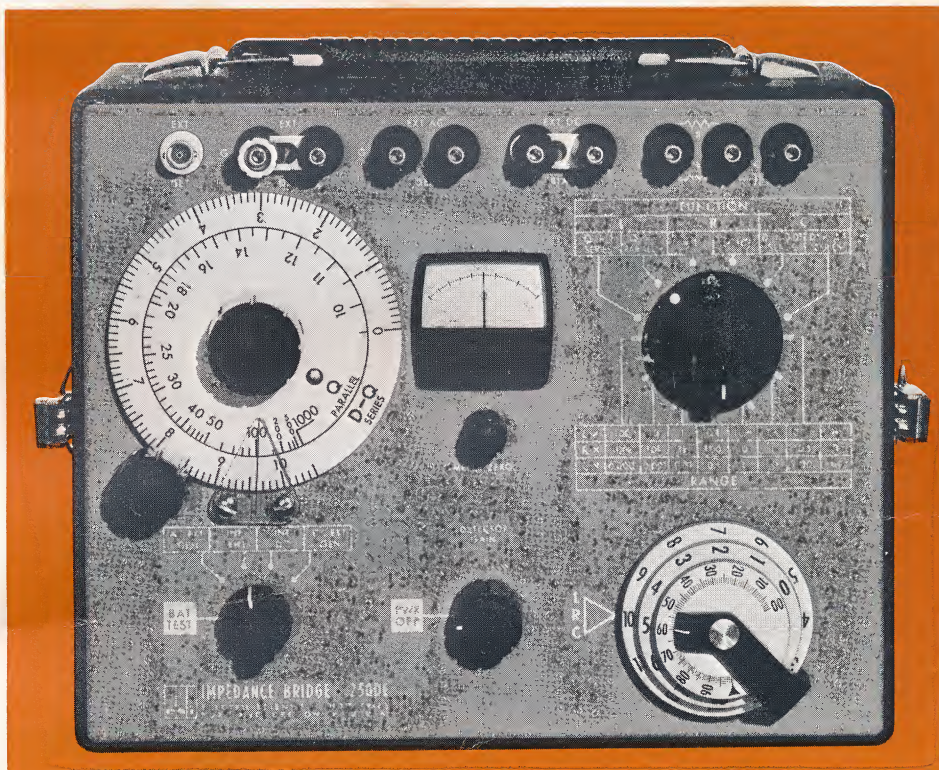




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250DE portable impedance bridge

- high-accuracy resistance, capacitance, inductance measurements
- solid-state ac-dc detector and generator
- battery-operated from four 1.5-volt D cells
- provisions for bias, external generator-detector, range extension
- portable, rugged, lightweight



The Model 250DE Impedance Bridge is a completely self-contained, portable instrument for precision measurements of resistance, capacitance, and inductance. It can also be used to measure dissipation factor and storage factor for capacitors and inductors. Its accuracy is conservatively rated at 0.1% for resistance, 0.2% for capacitance, and 0.3% for inductance. Even greater precision is possible for comparative measurements because of the 12,005 divisions of dial resolution.

This instrument is extremely versatile for ac measurements involving dc bias and is recommended where battery portability is desirable. Other applications include non-destructive life prediction testing, production limits testing, and temperature measurement using copper resistance. Operation instructions are permanently affixed to the inside cover of the carrying case.

An ac-dc null detector is combined with an ac generator with transformer output and diode rectifiers for direct current. Both are solid-state throughout. Precision mica card resistors ensure accuracy and stability, and the patented DEKADIAL® coaxial main dial provides maximum ease of adjustment and convenience in reading.

250DE portable impedance bridge



The various functions of the Model 250DE Impedance Bridge are shown in the accompanying table, along with instrument range and specified accuracy. Accuracy is also shown in graphic form for measurements of resistors, low-loss inductors, and capacitors.

DETECTOR

AC Characteristics

Input Impedance: 1 MΩ.

Sensitivity: Continuously variable, 10 μV minimum detectable signal.

Frequency: 1 kHz.

DC Characteristics

Input Resistance: 1 MΩ.

Sensitivity: Continuously variable, 20 μV minimum detectable signal.

GENERATOR

AC Characteristics

Open-Circuit Voltage: 2.7 V rms.

Short-Circuit Current: 70 mA.

DC Characteristics

Open-Circuit Voltage: 2.1 VDC.

Short-Circuit Current: 40 mA.

Supply Power: Four 1.5 V size D batteries (supplied).

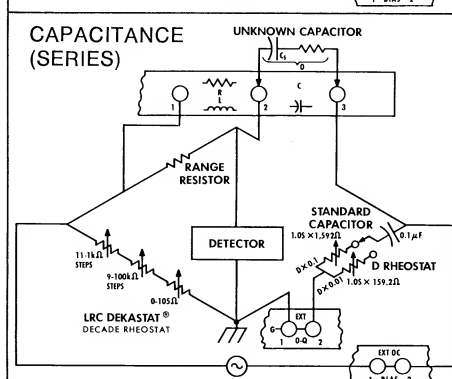
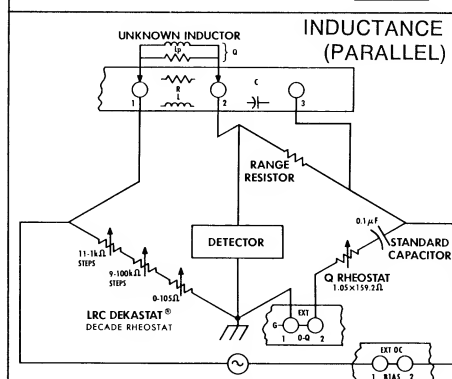
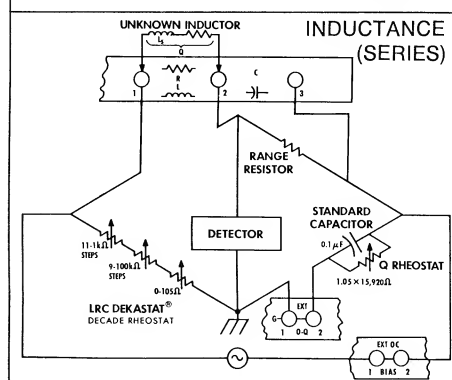
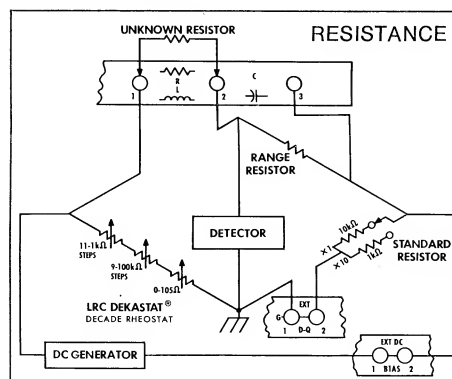
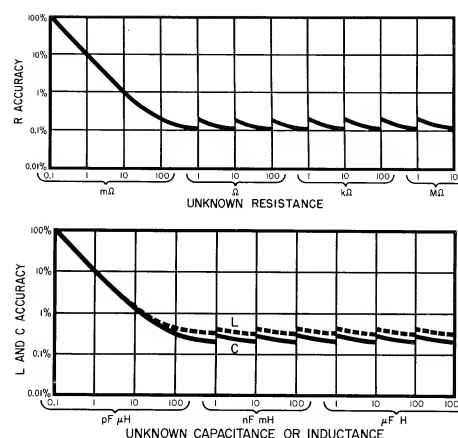
Battery Life: Approx 500 hr (6 mo normal service).

Dimensions: Width 10.6 in. (26.9 cm), height 8.4 in. (21.3 cm), depth 6.9 in. (17.5 cm).

Weight: 12 lb (5.4 kg).

Price: \$470.00 f.o.b. Portland, Oregon.

U.S. Patents 2,786,122, D-198,163, 3,150,634 and patents pending.



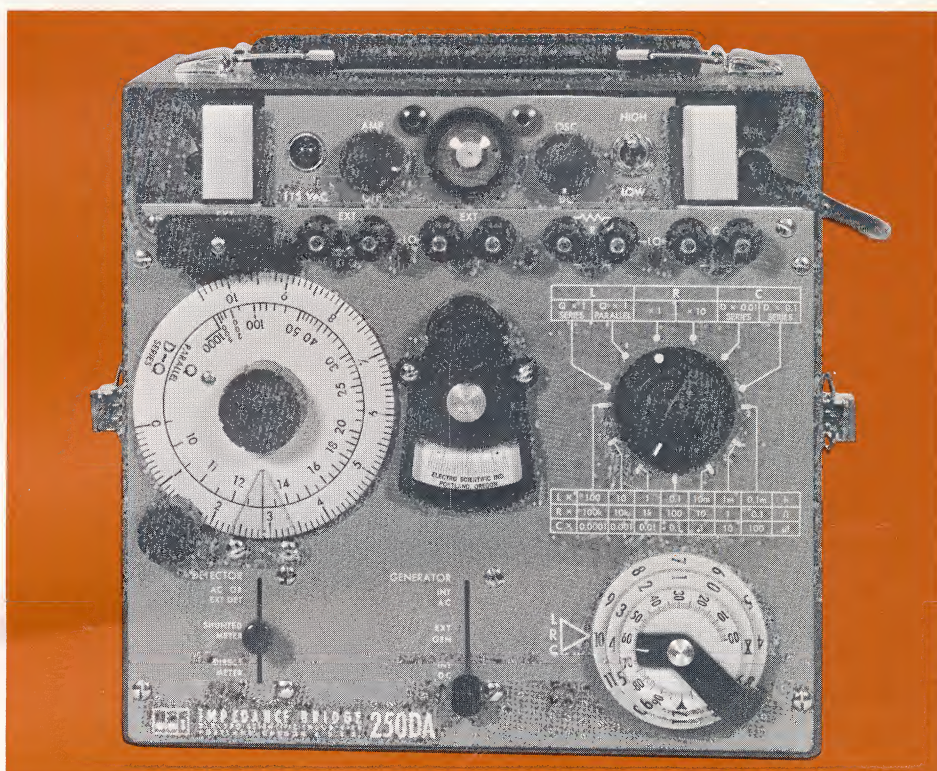
FUNCTION	RANGES		ACCURACY		
	MAGNITUDE	D OR Q	RANGES	MAGNITUDE	D OR Q
Resistance	0-12 MΩ in eight ranges; 0.1 mΩ per dial division on lowest R range.		All eight ranges	0.1% + 1 dial division	
Inductance (Series)	0-1200 H in seven ranges; 0.1 μH per dial division on lowest L range.	Q = 0 to 10.5, 0.1 per dial division.	Highest	0.3% + 1 dial division + 4.0% × 1/Q	0.040 (1 + Q²) + 0.02Q
			Other five	0.3% + 1 dial division + 0.5% × 1/Q	0.005 (1 + Q²) + 0.02Q
			Lowest	0.3% + 1 dial division + 4.0% × 1/Q	0.040 (1 + Q²) + 0.02Q
Inductance (Parallel)	0-1200 H in seven ranges; 0.1 μH per dial division on lowest L range.	Q = 10 to 1000, scale reads Q; dial is linear in 1/Q.	Highest	0.3% + 1 dial division + 4.0% × 1/Q	0.040 (1 + D²) + 0.02Q
			Other five	0.3% + 1 dial division + 0.5% × 1/Q	0.005 (1 + D²) + 0.02Q
			Lowest	0.3% + 1 dial division + 4.0% × 1/Q	0.040 (1 + D²) + 0.02Q
Capacitance (Series)	0-1200 μF in seven ranges; 0.1 pF per dial division on lowest C range.	D = 0 to 1.05 in two ranges; 0.001 per dial division on lowest D range.	Highest	0.2% + 1 dial division + 4.0% × D	0.040 (1 + D²) + 0.02D
			Other five	0.2% + 1 dial division + 0.5% × D	0.005 (1 + D²) + 0.02D
			Lowest	0.2% + 1 dial division + 4.0% × D	0.040 (1 + D²) + 0.02D



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250DA portable impedance bridge

- high-accuracy resistance, capacitance, inductance measurements
- plug-in frequency networks
- provisions for external detector-generator, range extension
- compact, rugged, line-operated



The Model 250DA Portable Impedance Bridge is a line-operated, portable unit for making accurate measurements of impedance elements at dc and audio frequencies. The bridge contains a line-operated power supply, sensitive galvanometer, tuned ac generator, and high-gain tuned ac amplifier with an electron-ray-tube visual null indicator. Provision is also made for using external generators and detectors. Frequency is adjustable by means of easily replaceable tuning networks.

Close manufacturing tolerances and highest quality materials permit a conservative accuracy rating of 0.1% for resistance, 0.2% for capacitance, and 0.3% for inductance. Comparative measurements can be made with even greater precision because of the 12,005 divisions of dial resolution.

In addition to making component measurements in both critical and routine operations, the Model 250DA bridge has found wide acceptance for quality control testing, precise component matching, and correlation of source and receiving inspection tests. It is conveniently portable, with a strong

protective case and rugged components, thereby encouraging measurements with laboratory accuracy even under field or industrial conditions. Complete operating instructions are permanently affixed to the inside of the instrument lid.

In addition to the Model 250DA bridge, a rack-mounted version is available as the Model 250DAR. Accuracy and other specifications are identical.

250DA portable impedance bridge



The ranges of the Model 250DA are given in the accompanying table, along with corresponding accuracy figures and equivalent circuits. The two curves show the specified accuracy for measurements of resistors, low-loss inductors, and capacitors.

AC GENERATOR-DETECTOR

Open-Circuit Voltage: 0 to 15 V.

Internal Impedance: 600 Ω .

Sensitivity: 100 μ V for visible deflection.

Second Harmonic Rejection: Approx 20 dB.

DC GENERATOR-DETECTOR

Low-Range Source: 10 V open circuit, 50 Ω internal resistance.

High-Range Source: 300 V open circuit, 22 k Ω internal resistance.

Galvanometer Sensitivity: 2 dial divisions/mV.

Internal Resistance: 1 k Ω .

Critical Damping Resistance: 2.5 k Ω .

FREQUENCY TUNING NETWORKS

One 1 kHz set supplied. Table lists frequencies available from stock; others available on special order. Accuracy $\pm 1\%$.

Power Requirement: 110 to 120 V, 50 to 400 Hz.

Model 250DA (Portable)

Dimensions: Width 10.7 in. (27.2 cm), height 9.2 in. (23.4 cm), depth 9.5 in. (24.1 cm).

Weight: 15.5 lb (7 kg).

Price: \$495.00 f.o.b. Portland, Oregon.

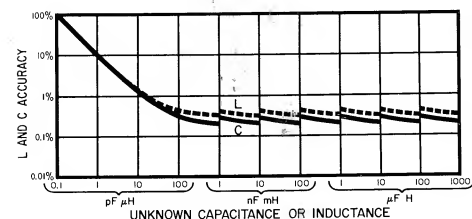
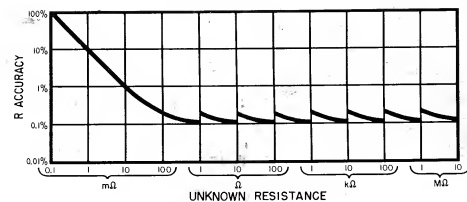
Model 250DAR (Rack-Mounting)

Dimensions: Width 19 in. (48.25 cm), height 10.5 in. (26.7 cm), depth 8.6 in. (21.8 cm).

Weight: 17.5 lb (7.95 kg).

Price: \$565.00 f.o.b. Portland, Oregon.

U.S. Patents 2,786,122, D-198,163, and 3,150,634.



FREQUENCY	ESI PART NO.		PRICE
	AMPLIFIER	OSCILLATOR	
60 Hz	4411	4434	\$40.00
100 Hz	4401	4421	40.00
120 Hz	4410	4433	40.00
400 Hz	4402	4422	40.00
1 kHz	4400	4420	30.00
10 kHz	4403	4423	30.00

FUNCTION	RANGES			ACCURACY	
	MAGNITUDE	D OR Q		MAGNITUDE	D OR Q
Resistance	0-12 M Ω in eight ranges; 0.1 m Ω per dial division on lowest R range.		All eight ranges	0.1% + 1 dial division	
Inductance (Series)	0-1200 H in seven ranges; 0.1 μ H per dial division on lowest L range.	$Q = 0$ to $10.5 \times f_{KC}$, $0.1 \times f_{KC}$ per dial division.	Highest	$0.3\% + 1$ dial division + $4.0\% \times f_{KC}/Q$	$0.040 f_{KC} (1 + Q^2) + 0.02Q$
			Other five	$0.3\% + 1$ dial division + $0.5\% \times f_{KC}/Q$	$0.005 f_{KC} (1 + Q^2) + 0.02Q$
			Lowest	$0.3\% + 1$ dial division + $4.0\% \times f_{KC}/Q$	$0.040 f_{KC} (1 + Q^2) + 0.02Q$
Inductance (Parallel)	0-1200 H in seven ranges; 0.1 μ H per dial division on lowest L range.	$Q = (10 \text{ to } 1000) \times 1/f_{KC}$, scale reads Q ; dial is linear in $1/Q$.	Highest	$0.3\% + 1$ dial division + $4.0\% \times f_{KC}/Q$	$0.040 f_{KC} (1 + D^2) + 0.02Q$
			Other five	$0.3\% + 1$ dial division + $0.5\% \times f_{KC}/Q$	$0.005 f_{KC} (1 + D^2) + 0.02Q$
			Lowest	$0.3\% + 1$ dial division + $4.0\% \times f_{KC}/Q$	$0.040 f_{KC} (1 + D^2) + 0.02Q$
Capacitance (Series)	0-1200 μ F in seven ranges; 0.1 pF per dial division on lowest C range.	$D = 0$ to $1.05 \times f_{KC}$ in two ranges, $0.001 \times f_{KC}$ per dial division on lowest D range.	Highest	$0.2\% + 1$ dial division + $4.0\% \times D \times f_{KC}$	$0.040 f_{KC} (1 + D^2) + 0.02D$
			Other five	$0.2\% + 1$ dial division + $0.5\% \times D \times f_{KC}$	$0.005 f_{KC} (1 + D^2) + 0.02D$
			Lowest	$0.2\% + 1$ dial division + $4.0\% \times D \times f_{KC}$	$0.040 f_{KC} (1 + D^2) + 0.02D$

